

## **ALL-OPTICAL 3R REGENERATOR USING SOLITARY WAVE INTERACTIONS**

### **Abstract of the Disclosure**

A method and apparatus for all-optical signal regeneration in fiber optic communications networks is provided. The process utilizes solitary wave interactions in various nonlinear optical media to re-shape, re-amplify and re-time optical signals that have traveled over large distances of fiber-optic cable. The device consists of an optical clock generator synchronized to the system clock, recovered from the input signal by a clock recovery unit. The output of the optical clock is then used to produce a solitary wave in the nonlinear material that collides with the coincident signal beam. The net result is an all-optical signal regenerator. A multi-channel device capable of providing signal regeneration on multiple wavelengths using a single clock recovery and optical clock generator assembly is also disclosed.